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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,348	12/13/2001	Harold E. Hamilton	M366.12-0021	8979

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MINNEAPOLIS, MN 55402-3319

EXAMINER
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RALIS, STEPHEN J

ART UNIT	PAPER NUMBER
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3742

MAIL DATE	DELIVERY MODE
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11/13/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/020,348

Applicant(s)

HAMILTON ET AL.

Examiner

Stephen J. Ralis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,6,7,9-17 and 25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,6,7,9-17 and 25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's arguments, see pages 8-11, filed 03 April 2007, with respect to the rejection(s) of claim(s) 1, 1, 6, 7, 9-17 and 25 under 35 U.S.C. 102(e) and 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Kondou et al. (U.S. Patent No. 5,361,188). Kondou et al. discloses a burn-in oven comprising dummy substrates (14) with small fans (3) in combination with a plurality of substrates (1) forming a ducts to cool the IC chips (2) on the plurality of substrates (1).

### *Oath/Declaration*

2. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not state that the person making the oath or declaration acknowledges the duty to disclose to the Office all information known to the person to be material to patentability as defined in 37 CFR 1.56.

The "duty to disclose" statement is incorrect. The statement should read –I acknowledge the duty to disclose information which is material to patentability of this application in accordance with Title 37, Code of Federal Regulations Section 1.56. –.

A new oath or declaration with the correct "duty to disclose" statement in compliance with 37 CFR 1.67(a) is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 12-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites the limitation "a burn-in boards" in line 6. Applicant has recited "the plurality of first trays forming burn-in boards" in lines 2-3. It is unclear to whether the burn-in boards are the same or a new burn-in board. Further clarification is required.

Claim 12 recites the limitation "fan trays" in line 11. Applicant has recited "a plurality of fan trays forming burn-in boards" in lines 4-5. It is unclear to whether the fan tray is the same or part of the fan trays recited above. Further clarification is required.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the recitation to "a plurality of fan trays supported on walls of the compartment and each fan tray being spaced from a burn-in boards on a side of the respective burn-in board so that the fan trays overlies and are spaced the devices under test on the associated burn-in board

which underlies the respective fan tray" is unclear with respect to the relationship between to the fan trays overlying and spacing characteristics to the devices under test, Further clarification is required.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 6, 7, 10, 12, 16 and 25 rejected under 35 U.S.C. 102(b) as being anticipated by Kondou et al. (U.S. Patent No. 5,361,188).

Kondou et al. disclose, in combination, a burn-in oven (compact high performance computer 15) having a heat control system (column 2, lines 37-59), and a plurality of first trays (plurality of substrates 1) in the burn-in oven (compact high performance computer 15), combined a cooling airflow source (air intake into fan 13; see Figure 2), the burn-in oven defining a compartment (see Figure 1, 2, 23) the plurality of first trays (plurality of substrates 1) forming burn-in boards (plurality of substrates 1) having devices (IC chips 2) under test mounted thereon in a preselected array and edges of the burn-in boards being supported on walls of the compartment (see Figures 1, 2, 23); a plurality of fan trays (dummy substrate 14; column 11, lines 3-19; see Figure 23) supported on walls of the compartment (see Figures 1, 2, 23) and each fan tray (dummy substrate 14) being spaced from the burn-in boards (plurality of

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substrates 1) on a side of the respective burn-in board (plurality of substrates 1) so that the fan trays (dummy substrate 14) overlie and are spaced the devices under test (IC chips 2) on the associated burn-in board (plurality of substrates 1) which underlies the respective fan tray (dummy substrate 14), a laterally extending space above each of the fan trays (dummy substrates 14) comprising a plurality of airflow ducts, one between each fan tray (dummy substrate 14), and an overlying burn-in board (plurality of substrates 1), the airflow ducts extending laterally to provide airflow to the fan trays (see Figure 23), a plurality of fan outlet openings (orifices to accommodate small fan 3; column 111, lines 3-19; see Figure 23) in each fan tray (dummy substrate 14), one fan outlet opening overlying each device under test (IC chips 2) associated with one respective underlying burn-in board (see Figure 23), a plurality of controllable fans (small fans 3) mounted on each fan tray (dummy substrate 14), one controllable fan being mounted at each fan outlet opening (see Figure 23), a source of cooling fluid flow on one lateral side of the airflow ducts (see Figure 2), a controlled size inlet opening from the cooling airflow source to each of the ducts (see Figure 1, 2, 23), and a controller for selectively controlling the operation of each controllable fan as a function of a temperature signal provided from the device under test underlying the respective controllable fan (column 2, lines 3-16, 37-29; column 3, lines 33-39).

With respect to the limitations of claim 1 and the device under test being associated with a heat exchanger, Kondou et al. discloses an embodiment wherein the device under test can take the form of a more complicated device (LSI package 7) requiring a heat exchanger (heat radiation fin 27) as part of the support with the cooling

air flow coming from the opposite side thereof to provide a further cooling effect to the device under test (LSI package 7), thereby further improving the cooling performance as well as increasing the reliability (column 9, lines 10-29).

With respect to the limitations of claim 6, Kondou et al. disclose the source of cooling air (see Figure 2) comprises a plenum chamber at the one end of the oven chamber (the left side of Figure 2), a second fan (fan 13 on right side of Figure 2) providing an airflow to the plenum chamber, and the second fan receiving a return airflow from the oven chamber.

With respect to the limitations of claim 7, Kondou et al. disclose a plurality of oven chambers (see Figure 2, 10, 23) with each chamber having at least one burn-in board (plurality of substrates 1) supporting devices under test (IC chips 2). Kondou et al. further disclose, as noted above, separate fan boards (dummy substrates 14) spaced from each burn-in board (plurality of substrates 1) to form the space with a separate fan outlet associated with each device under test (IC chips 2) (column 11, lines 3-19; see Figure 23).

With respect to claim 10, Kondou et al. disclose a series of vertically stacked burn-in boards (plurality of substrates 1) in the oven chamber (compact high performance computer 15) (see Figure Figures 1, 2, 23), each with an associated wall forming a duct (see Figure 23), the walls forming ducts comprising fan boards (dummy substrates 14), one fan board (dummy substrate 14) spaced from each burn-in board (plurality of substrates 1) on a side of the associated burn-in board (plurality of substrates 1) toward the devices under test (IC chips 2), each fan (small fan 3) being

supported on a fan board (dummy substrate 14) for directing cooling air through an opening in the respective fan board (dummy substrate 14) onto the device under test (IC chip 2), and wherein each burn-in board (plurality of substrates 1) forms one of the ducts in combination with an underlying fan board (dummy substrate 14) that is associated with a burn-in board (plurality of substrates 1) on an opposite side of the fan board (dummy substrate 14) from the respective duct, the cooling air in the respective duct cooling the surface of the burn-in board (plurality of substrates 1) forming a wall of that duct (column 11, lines 3-19; see Figure 23).

With respect to the limitations of claim 16, Kondou et al. disclose a blower (fan 13) for providing the flow of cooling air to inlet ends of the ducts, and a flow passageway carrying air from the blower to the inlet ends to provide cooling air to each of the ducts (column 11, lines 3-19; see Figures 1, 2, 23).

As the reference meets all material limitations of the claims at hand, the reference is anticipatory.

***Joint Inventors – Common Ownership Presumed***

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to



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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 2, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondou et al. (U.S. Patent No. 5,361,188) in view of Hamilton et al. (U.S. Patent No. 5,582,235).

Kondou et al. disclose all of the limitations of the claimed invention, as previously set forth, except for a damper movable to adjust a size of a damper opening for the airflow, and a controller for controlling the opening of the damper in response to a selected parameter.

However, a damper movable to adjust a size of a damper opening for the airflow, and a controller for controlling the opening of the damper in response to a selected parameter, as described by Hamilton et al., is known in the art. Hamilton et al. teach a gas flow controller (35) controlling nozzle controllers (110a-110n), via signals provided by leads (95a-95n), nozzle controllers (110a-110n) to regulate the volume of gas output of nozzle valve/damper (100a-100n) impinging on electronic component (25a-25n) (column 2, lines 42-57), thereby inherently providing a further means to regulate the temperature of the electronic component (column 1, line 58 – column 2, line 2). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the cooling assembly of Kondou et al. with the controlling of a movable valve of Hamilton et al. to regulate the volume of gas output impinging on electronic component, thereby inherently providing a further means to regulate the temperature of the electronic component.

With respect to the limitations of claim 7, Kondou et al. disclose a plurality of oven chambers (see Figure 2, 10, 23) with each chamber having at least one burn-in board (plurality of substrates 1) supporting devices under test (IC chips 2). Kondou et al. further disclose, as noted above,

11. Claims 9, 11, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondou et al. (U.S. Patent No. 5,361,188) in view of Fredeman et al. (U.S. Patent No. 6,504,392).

Kondou et al. disclose all of the limitations of the claimed invention, as previously set forth, except for the oven chamber has a heat exchanger for cooling air passing therethrough, the cooling air passing through the heat exchanger before entering the space; and individual heaters for heating each of the devices under test, the controller receiving a-the temperature signal from the respective device under test, and controlling its associated controllable fan and heater to maintain the temperature sensed at a desired range.

However, a burn-in oven comprising a heat exchanger to cool air into the oven as well as individuals heaters and fans associated with each device under test being controlled simultaneously with a controller is known in the art.

Fredeman et al. teach a series of burn-in ovens (see Figures 3a, 3b) comprising cooling being accomplished by water to air heat exchanger (column 6, lines 2-3) and this would inherently occur prior to the air entering the chamber (60) due to the chamber cooling fan (72) moving the air over the burn-in boards (48) which would inherently be pre-cooled due to the chamber fan (72) being a chamber cooling fan. Fredeman et al. further the advantage of the combination of a heat exchanger and a fan to move the cooled air removes large amounts of heat for each component by forced convection. In addition, Fredeman et al. teach an associated heater (22) and fan (22) and device temperature controller (98) to control the overall temperature individual components (32). Fredeman et al. further teach the advantage of such a configuration of including a heater with a fan provides improved control over the temperature of individual components, allows wider variation in power dissipation among components and

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further provides means to make up for wider variation in oven temperature (column 6, lines 36-51), thereby improving the overall temperature control of the device. It would have further been obvious to one of ordinary skill in the art at the time of the invention was made to modify the fan cooling air source of Kondou et al. with the heat exchanger and fan cooling combination of Fredeman et al. in order to provide removal of large amounts of heat for each component by forced convection. It would have further been obvious to one of ordinary skill in the art at the time of the invention was made to modify the fan cooling assembly of Kondou et al. with the inclusion of a heater and control thereof in order to provide improved control over the temperature of individual components, to allow wider variation in power dissipation among components and to further provide means to make up for wider variation in oven temperature, thereby improving the overall temperature control of the device.

With respect to the limitations of claim 11, The Kondou-Fredeman combination discloses all of the limitations, as previously set forth, except for a heat exchanger between each of the adjacent oven chambers, the airflow from one oven chamber passing to one other oven chamber and through the heat exchanger between the one chamber and the other chamber. Fredeman et al. disclose that it is known in the art to provide a water to air heat exchanger to cool the air cycling through a burn-in oven chamber (column 6, lines 2-12). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a heat exchanger of Fredeman et al. between chambers with the cooling of air cycling through a burn-in oven system,

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in order to provide a single source of cooled air being recycled through the system, thereby increasing the operating efficiency of the burn-in oven.

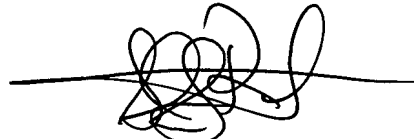
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Ralis whose telephone number is 571-272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on 571-272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Stephen J Ralis  
Examiner  
Art Unit 3742

SJR  
November 7, 2007



TU BA HOANG  
SUPERVISORY PATENT EXAMINER